



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

09/802,168

03/08/2001

Takashi Saida

44471-254519 (13700)

6188

23370

7590

05/03/2005

JOHN S. PRATT, ESQ  
KILPATRICK STOCKTON, LLP  
1100 PEACHTREE STREET  
ATLANTA, GA 30309

EXAMINER

KAO, CHIH CHENG G

ART UNIT

PAPER NUMBER

2882

DATE MAILED: 05/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/802,168

Applicant(s)

SAIDA ET AL.

Examiner

Chih-Cheng Glen Kao

Art Unit

2882

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 4/21/05.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>4/21/05</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Objections*

1. Claim 1 is objected to because of the following informality, which appears to be a minor draft error.

In the following format (location of objection; suggestion for correction), the following correction may obviate the objection: (claim 1, line 14, “combiner and the optical gate”; inserting a comma after “combiner”).

For purposes of examination, the claim has been treated as such. Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 5, and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Masetti et al. (“Optical Fiber Buffer for High-Performance Broadband Switching”).
3. Regarding claim 1, Masetti et al. discloses a device (fig. 7) comprising an input optical waveguide (fig. 7, synchronisation fibre); an optical splitter (fig. 7, fibre splitter) configured to split optical signals multiplexed on a time axis (fig. 7, 256-bit pattern generator) that are entered

Art Unit: 2882

at the input optical waveguide (fig. 7, synchronisation fibre) into plural sets; an optical delay waveguide array formed by a plurality of optical delay waveguides with mutually different delay amounts (fig. 7, delay lines) which are configured to delay the optical signals split by the optical splitter (fig. 7, fibre splitter); an optical combiner configured to combine the optical signals (fig. 7, fibre combiner) delayed by the optical delay waveguide array (fig. 7, delay lines); an output optical waveguide (fig. 7, waveguide at f-p filter) connected to an output port of the optical combiner (fig. 7, fibre combiner); and an optical gate configured to gate the optical signals outputted from the optical combiner or entered into the optical delay waveguide array (fig. 7, optical gates) on the time axis; wherein at least one of the optical splitter, the optical delay waveguide array, the optical combiner, and the optical gate has an optical amplitude adjustment function for adjusting amplitudes of the optical signals (fig. 10); and wherein the optical signal processing device is a purely optical device for optically processing the optical signals multiplexed on the time axis that operates entirely in an optical region (fig. 7, device from laser module to receiver).

4. Regarding claim 2, Masetti et al. further discloses wherein the optical delay waveguide array delays the optical signals (fig. 7, delay lines) and the optical amplitude adjustment function adjusts the amplitudes of the optical signals (fig. 10) such that an amplitude of an output signal of the optical gate (fig. 7, optical gates) represents a digital-to-analog (fig. 7, 256-bit pattern generator and sampling oscilloscope) converted value of the optical signals.

Note that the functional recitation of amplitude of an output signal of the optical gate representing a digital-to-analog converted value of the optical signals has not been given patentable weight because it is narrative in form.

5. Regarding claim 5, Masetti et al. further discloses wherein the optical gate includes a plurality of optical gate elements (fig. 7, optical gates) respectively provided on the optical delay waveguides of the optical delay waveguide array (fig. 7, delay lines).

6. Regarding claim 7, Masetti further discloses wherein the optical amplitude adjustment function adjusts the amplitudes of the optical signals (fig. 10) such that the optical signals outputted from the optical delay waveguide array (fig. 7, delay lines) are combined by the optical combiner (fig. 7, fibre combiner) at respectively different intensities.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masetti et al. as applied to claim 1 above, and further in view of Stone et al. (US Patent 5982515).

Art Unit: 2882

8. Regarding claim 3, Masetti et al. discloses a device as recited above. Masetti further et al. discloses the optical gate (fig. 7, optical gates) between the optical combiner (fig. 7, fibre combiner) and an output optical waveguide (fig. 7, waveguides after delay lines).

However, Masetti does not disclose optical components on a substrate.

Stone et al. teaches optical components on a substrate (fig. 16).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the device of Masetti et al. with the substrate of Stone et al., since one would be motivated to make such a modification to provide more structural stability (fig. 16) as implied from Stone et al.

9. Regarding claim 4 and for purposes of being concise, Masetti et al. as modified above suggests a device as recited above. Masetti et al. further discloses the optical gate (fig. 7, optical gates) connected to the output optical waveguide (fig. 7, waveguide after delay lines).

However, Masetti et al. does not disclose the optical gate outside the substrate.

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the device of Masetti et al. as modified above with the optical gate outside the substrate, since rearranging parts of an invention involves only routine skill in the art. One would be motivated to make such a modification for easier replacement of defective parts.

10. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Masetti et al. as applied to claim 5 above, and further in view of Wickham et al. (US Patent 6708003).

Art Unit: 2882

Masetti et al. discloses a device as recited above.

However, Masetti does not disclose phase controllers respectively provided on optical delay waveguides of an optical delay waveguide array.

Wickham et al. teaches phase controllers (fig. 1, #22) respectively provided on optical delay waveguides of an optical delay waveguide array (fig. 1, #28).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the device of Masetti et al. with the phase controllers of Wickham et al., since one would be motivated to make such a modification to better control the optical signal for more efficient transmission to a destination point (abstract) as implied from Wickham et al.

11. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Masetti et al. as applied to claim 1 above, and further in view of Wickham et al., Okuno et al. (JP 11-133364), and Ishida et al. (US Patent 5937117).

Masetti et al. discloses a device as recited above.

However, Masetti et al. does not disclose waveguides provided in forms of silica-based optical waveguides and a Mach-Zehnder switch having a thin film heater connected with another thin film heater as the amplitude controller.

Wickham et al. teaches waveguides provided in forms of silica-based optical waveguides (col. 4, lines 11-13). Okuno et al. teaches a Mach-Zehnder switch having a heater (fig. 1, #10) connected with another heater (fig. 1, #11) as the amplitude controller (title). Ishida et al. teaches thin film heaters in Mach-Zehnder switches (fig. 22, #165).

Art Unit: 2882

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the device of Masetti et al. with the silica-based waveguides of Wickham et al., since one would be motivated to make such a modification to more easily place the components of the device on a compact surface substrate (fig. 1, substrate under #12) as implied from Wickham et al.

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the device of Masetti et al. with the Mach-Zehnder switch as an amplitude controller of Okuno et al., since one would be motivated to make such a modification to provide a controller with higher reliability (abstract, problem to be solved) as shown by Okuno et al.

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the device of Masetti et al. as modified above with the thin film heater of Ishida et al., since one would be motivated to make such a modification to make the device more compact (col. 1, line 56, "thin film") as implied from Ishida et al.

12. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Masetti et al. as applied to claim 1 above, and further in view of Kito et al. (JP 09-258045).

Masetti et al. discloses a device as recited above.

However, Masetti et al. does not disclose a multi-mode interference optical coupler.

Kito et al. teaches a multi-mode interference optical coupler (abstract, solution).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the device of Masetti et al. with the coupler of Kito et al.,



Art Unit: 2882

since one would be motivated to make such a modification for faster optical transmissions in optical communication systems (abstract, problem to be solved) as implied from Kito et al.

13. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Masetti et al. as applied to claim 1 above, and further in view of Inoue et al. (US Patent 5546483).

Masetti et al. discloses a device as recited above.

However, Masetti et al. does not disclose a TE/TM converter.

Inoue et al. teaches a TE/TM converter (col. 16, lines 1-10).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the device of Masetti et al. as modified above with the TE/TM converter of Inoue et al., since one would be motivated to make such a modification to achieve polarization-independent operation (col. 15, lines 54-67) as implied from Inoue et al. to thereby reduce birefringence and obtain a better signal.

14. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masetti et al. in view of Amersfoort et al. (US Patent 5748811).

For purposes of being concise, Masetti et al. discloses a device as recited above. Masetti et al. further discloses optical gates, which would necessarily extract at identical timing (fig. 7, optical gates), since the timing of the extraction process stays the same each time the gate is turned on.

However, Masetti et al. does not disclose a switch and second array.

Amersfoort et al. teaches a switch and second array (fig. 14, #174, 176, and 178).

Art Unit: 2882

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the device of Masetti et al. with the switch and second array of Amersfoort et al., since one would be motivated to make such a modification to create networks where signals are switched among fibers without the necessity of converting the signal to electrical form (col. 1, lines 25-30) as implied from Amersfoort.

15. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Masetti et al. and Amersfoort et al. as applied to claim 11 above, and further in view of Wickham et al. and Ishida et al.

Masetti et al. as modified above suggests a device as recited above.

However, Masetti et al. does not disclose waveguides provided in forms of silica-based optical waveguides and a Mach-Zehnder switch having a thin film heater.

Wickham et al. teaches waveguides provided in forms of silica-based optical waveguides (col. 4, lines 11-13). Ishida et al. teaches a Mach-Zehnder switch having a thin film heater (fig. 22, #165).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the device of Masetti et al. as modified above with the silica-based waveguides of Wickham et al., since one would be motivated to make such a modification to more easily place the components of the device on a compact surface substrate (fig. 1, substrate under #12) as implied from Wickham et al.

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the device of Masetti et al. as modified above with the Mach-

Art Unit: 2882

Zehnder switch of Ishida et al., since one would be motivated to make such a modification to make the device more compact (col. 1, line 56, "thin film") as implied from Ishida et al.

16. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Masetti et al. and Amersfoort et al. as applied to claim 11 above, and further in view of Kito et al.

Masetti et al. as modified above suggests a device as recited above.

However, Masetti et al. does not disclose a multi-mode interference optical coupler.

Kito et al. teaches a multi-mode interference optical coupler (abstract, solution).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the device of Masetti et al. as modified above with the coupler of Kito et al., since one would be motivated to make such a modification for faster optical transmissions in optical communication systems (abstract, problem to be solved) as implied from Kito et al.

17. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Masetti et al. and Amersfoort et al. as applied to claim 11 above, and further in view of Inoue et al.

Masetti et al. as modified above suggests a device as recited above.

However, Masetti et al. does not disclose a TE/TM converter.

Inoue et al. teaches a TE/TM converter (col. 16, lines 1-10).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the device of Masetti et al. as modified above with the TE/TM converter of Inoue et al., since one would be motivated to make such a modification to

Art Unit: 2882

achieve polarization-independent operation (col. 15, lines 54-67) as implied from Inoue et al. to thereby reduce birefringence and obtain a better signal.

***Response to Arguments***

18. Applicant's arguments with respect to claims 1-15 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chih-Cheng Glen Kao whose telephone number is (571) 272-2492. The examiner can normally be reached on M - F (9 am to 5 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



gk



EDWARD J. GLICK  
SUPERVISORY PATENT EXAMINER